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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/541,462	07/06/2005	Kazushige Ohno	273432US90PCT	8929
22850 7590 04/23/2009 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER ROBINSON, LAUREN E				
ART UNIT 1794		PAPER NUMBER		
NOTIFICATION DATE 04/23/2009		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/541,462

Applicant(s)

OHNO ET AL.

Examiner

LAUREN ROBINSON

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4,7-9,11,13,14,19-21,23 and 25-29 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,4,7-9,11,13,14,19-21,23 and 25-29 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 July 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/2008, 3/2009
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 17, 2009 has been entered.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 1-2, 4, 9, 11, 13-14, 16 and 29 are rejected under 35 U.S.C. 102(b) as being anticipated by Ito (JP 0323779), translation enclosed, as evidenced by Waku et al. (US PN. 5, 981, 415).

Regarding claims 1 and 13: Ito teaches a ceramic porous sintered body (title) comprising a sintered body comprising a plurality of ceramic coarse particles and a sintered body portion comprising a plurality of granular crystals thereby corresponding to a polycrystalline sintered body (Pg. 6, paragraphs 1-2, Figure 1). As seen in Figure 1, this polycrystalline body forms a bonding layer which exists between the ceramic coarse particles and connects said coarse particles. Also as seen in Figure 1, the

polycrystalline body includes a plurality of ceramic fine crystal particles having an average particle size smaller than the coarse particles (Figure 1). Ito also teaches that the sintered body has an average pore size of 15 to 25 microns (Pg. 4, paragraph 2 and Pg. 12, paragraph 2).

Ito also teaches that the above mentioned ceramic porous body can be used to produce a ceramic honeycomb filter for filtering exhaust gas (all). Ito teaches that the ceramic porous body will have a cylindrical pillar shape and that a plurality of pores will be produced in the axial direction (Pg. 12, paragraph 4). While Ito does not specifically disclose the applicants' claimed plurality of cells for gas passageways in the longitudinal direction of the pillar, the examiner notes that one having ordinary skill would reasonably expect this to be present from what is taught within Ito. For example, the examiner notes that it is well known in the art that in honeycomb filters for filtering exhaust gas, a plurality of cells placed in the longitudinal direction are obtained as this is the manner in which gas is made to enter and thereby filtered. For this reason, the mere teaching that the porous body creates a cylindrical pillar honeycomb filter, one having ordinary skill in the art would reasonably expect the applicants' claimed plurality of longitudinal cells for gas passageways to be present

Additionally, while the reference does not specifically disclose the applicants' claimed size distribution ratio of coarse particles to fine particles, one having ordinary skill would find this limitation to be present. For example, it is well known in the art that pore size is dependent on particle size distribution and this would not only be obtained looking at Figure 1 within Ito but also from features as taught in the art (Waku, column

2, lines 55-65). For this reason, as it is seen that the applicants' claimed pore size is within Ito, one having ordinary skill would reasonably expect the applicants' claimed size distribution to also be therein as this is the well known feature to produce such pore size. As such, the claimed size distribution would be found present absent an objective showing to the contrary (**Claims 1 and 13**).

Regarding claims 2 and 14: As Ito does not specifically teach that the coarse particles comprise single-crystal particles, Ito does not recite that they are polycrystalline, etc.. The examiner notes that from what is well understood in the art, one having ordinary skill would reasonably expect that since no alternative forms are discussed and/or desired in Ito from the typical crystal structure as known in the art, the particles comprising the coarse particles would be reasonably expected to be single crystalline. (**Claims 2 and 14**).

Regarding claims 4 and 16: Additionally, although the reference does not recite that the polycrystalline bonding layer within the sintered body has less strength than the coarse particle, this would also be present in Ito as it was discussed above that the same structure is taught (polycrystalline body bonding single crystalline coarse particles). Further, both sets of particles are silicon carbide which is the same as used throughout applicants' disclosure. Therefore, since both the materials and crystallized structure of both bonding layer and coarse particles are the same as applicants', it would be reasonably expected that physical properties of each would also be the same. As such, the claimed brittle characteristics and strength relationship as claimed would be expected to be present in Ito (**Claims 4 and 16**).

Regarding claims 9 and 21: As discussed, the polycrystalline bonding layer and coarse particles are made of silicon carbide (**Claims 9 and 21**).

Regarding claims 11 and 23: Also, Ito teaches that the coarse particles (particles without carbonaceous material) are in an amount of 200 parts by weight with the fine particles (with carbonaceous material) being in an amount of 100 parts by weight (Pg. 13, paragraph 3). This provides a ratio of 2:1 falling within applicants range (**Claims 11 and 23**).

Regarding claim 29: Again as discussed, the porous sintered body is comprised of a sintered body having a plurality of coarse particles with a polycrystalline sintered body forming a bonding layer existing there between and connecting said coarse particles. The fine particles have an average particle diameter smaller than the coarse particles as illustrated in Figure 1 and the average pore size of the overall body is 15 to 25 micron.

The reference throughout teaches that polycrystalline sintered body includes the plurality of ceramic fine particles which are formed by sintering (all) and grains of the fine particles remain (Figures, all). Also, as seen in Figure 1 within Ito, the bonding layer attaches to and connects the coarse particles and this corresponds to forming a bridge (**Claim 29**).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 25-28 are rejected under 35 U.S.C. 103(a) as being obvious over Ito (JP 0323779) as applied to claims 1 and 13 above from section 1 above.

As discussed, Ito teaches applicants' invention of claims 1 and 13. However, the reference fails to teach specifically the applicants' claimed sizes for both the fine and coarse particles although this would have been obvious. For instance, while Ito discloses in some embodiments that the coarse particles have an average diameter of 100 microns, nowhere in their teaching do they limit the size to 100. Therefore, one having ordinary skill would know that the size could be varied. Further, it is well known in the art that particle size is result effective as adjusting the size, physical properties will change such as strength, etc. of the bonding layer and/or the main component of the body as well as the final size of the sintered body. Therefore, one having ordinary skill would know that by adjusting the particle size of the coarse particles and/or the fine particles to any value, desired results can be obtained. As such, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Ito to include that the particle size of the coarse particles and/or fine particles can be modified to any size to obtain desired strength, etc. of the bonding layer and/or the main body component as well as the overall produced body size (honeycomb size desired).

Additionally, the examiner notes that through such routine experimentation, the applicants' claimed pore size and size distribution will still occur. This is due to the claimed sized particles producing applicants' distribution as well as since it was

discussed that the pore size is dependent on the size distribution and this will be obtained from such sized particles, then so will the claimed pore size (**Claims 25-28**).

3. Claims 7-8 and 19-20 are rejected under 35 U.S.C. 103(a) as being obvious over Ito (JP 0323779) as applied to claims 1 and 13 from section 1 above, in view of Okuno et al. (US PN. 4,701,426).

Regarding claims 7 and 19: As discussed, Ito teaches applicants' invention of claims 1 and 13. However, the reference does not specifically disclose the use of a sintering aid chosen from the claimed groups within the bonding layer although this would have been obvious.

For instance, Ito is illustrating that the bonding layer is silicon carbide with a carbonaceous material such as carbon black on the grain boundaries (Pg. 8, paragraph 1) in order to somewhat inhibit grain growth of the fine silicon carbide particles during sintering (Pg. 6, paragraph 1). According to Okuno et al., a sintered silicon carbide material can have effective grain growth inhibition with the use of carbon black, but additionally, sintering aids such as aluminum can be added therein in order to provide efficient sinterability and thermal shock resistance (Col. 3, lines 48-67-Col. 4, lines 1-16). As both Ito and Okuno et al. disclose analogous inventions related to sintered silicon carbide materials with carbon black added therein for the purpose of inhibiting grain growth, one having ordinary skill in the art would recognize from Okuno that incorporating a sintering aid (aluminum) in such a composition would help the materials sinterability and provide shock resistance which Okuno illustrates is desirable. As such, it would have been obvious to one having ordinary skill in the art at the time of invention

to modify Ito to include that a sintering aid such as aluminum can be added to the SiC/carbon black bonding layer in order to obtain efficient sinterability and thermal shock resistance for such a combination (**Claims 7 and 19**).

Regarding claims 8 and 20: Further, the examiner notes that the above modification was to include the sintering aid within the bonding layer itself and not the plate like coarse crystals because Okuno was illustrating that such an addition is desired in a composition similar to the bonding layer. As such, through the above modification, no sintering aid was added to the coarse crystals and therefore, the content of sintering aid is higher within the bonding layer (>0%) than the coarse particles (0%) (**Claims 8 and 20**).

4. Claims 1-2, 4, 9, 11, 13-14, 16, 25-28 are rejected under 35 U.S.C. 103(a) as being obvious over Ito (JP 0323779) as evidenced by Waku et al. (US PN. 5, 981, 415).

Regarding claims 1 and 13: Ito teaches a ceramic porous sintered body (title) comprising a sintered body comprising a plurality of ceramic coarse particles and a sintered body portion comprising a plurality of granular crystals thereby corresponding to a polycrystalline sintered body (Pg. 6, paragraphs 1-2, Figure 1). As seen in Figure 1, this polycrystalline body forms a bonding layer which exists between the ceramic coarse particles and connects said coarse particles. Also as seen in Figure 1, the polycrystalline body includes a plurality of ceramic fine crystal particles having an average particle size smaller than the coarse particles (Figure 1). Ito also teaches that the sintered body has an average pore size of 15 to 25 microns (Pg. 4, paragraph 2 and Pg. 12, paragraph 2).

Ito also teaches that the above mentioned ceramic porous body can be used to produce a ceramic honeycomb filter for filtering exhaust gas (all). Ito teaches that the ceramic porous body will have a cylindrical pillar shape and that a plurality of pores will be produced in the axial direction (Pg. 12, paragraph 4). While Ito does not specifically disclose the applicants' claimed plurality of cells for gas passageways in the longitudinal direction of the pillar, the examiner notes that one having ordinary skill would reasonably expect this to be present from what is taught within Ito. For example, the examiner notes that it is well known in the art that in honeycomb filters for filtering exhaust gas, a plurality of cells placed in the longitudinal direction are obtained as this is the manner in which gas is made to enter and thereby filtered. For this reason, the mere teaching that the porous body creates a cylindrical pillar honeycomb filter, one having ordinary skill in the art would reasonably expect the applicants' claimed plurality of longitudinal cells for gas passageways to be necessarily present

Although the above limitations are disclosed, the reference is silent regarding the claimed ratio of average size between the fine crystal particles and the coarse particles as well as the individual sizes themselves, although this would have been obvious. For example, it is very well known in the art, that size distribution of the coarse particles to the fine particles is result effective as these characteristics will affect the final pore size. This concept is discussed within Waku et al. (Column 2, lines 55-65) as well as what one having ordinary skill would gather from the Figure 1 within Ito. Therefore, one having ordinary skill would know that through routine experimentation of optimizing the particle sizes, desired porosity can be obtained. As such, it would have been obvious to

one having ordinary skill in the art at the time of invention to modify Ito to include that the size distribution of the coarse particles to the fine ones can be adjusted to any values to obtain desired porosity, etc. results (**Claims 1 and 13**).

Regarding claim 13: Ito also teaches that the above mentioned ceramic porous body can be used to produce a ceramic honeycomb filter for filtering exhaust gas (all). Ito teaches that the ceramic porous body will have a cylindrical pillar shape and that a plurality of pores will be produced in the axial direction (Pg. 12, paragraph 4).

While Ito does not specifically disclose the applicants' claimed plurality of cells for gas passageways in the longitudinal direction of the pillar, the examiner notes that one having ordinary skill would reasonably expect this to be present from what is taught within Ito. For example, the examiner notes that it is well known in the art that in honeycomb filters for filtering exhaust gas, a plurality of cells placed in the longitudinal direction are obtained as this is the manner in which gas is made to enter and thereby filtered. For this reason, the mere teaching that the porous body creates a cylindrical pillar honeycomb filter, one having ordinary skill in the art would reasonably expect the applicants' claimed plurality of longitudinal cells for gas passageways to be present (**Claim 13**).

Regarding claims 2 and 14: As Ito does not specifically teach that the coarse particles comprise single-crystal particles, as discussed, Ito does not recite that they are polycrystalline, etc.. The examiner notes that from what is well understood in the art, one having ordinary skill would reasonably expect that since no alternative forms are discussed and/or desired in Ito from the typical crystal structure as known in the art, the

particles comprising the coarse particles would be reasonably expected to be single crystalline. As such, this feature would be present absent an objective showing to the contrary (**Claims 2 and 14**).

Regarding claims 4 and 16: Additionally, although the reference does not recite that the polycrystalline bonding layer within the sintered body has less strength than the coarse particle, this would also be found to be present as it was discussed above that the same structure is taught (polycrystalline body bonding single crystalline coarse particles). Further, it would be found especially present as both sets of particles are silicon carbide which is the same as used throughout applicants' disclosure. Therefore, since both the materials and crystallized structure of both bonding layer and coarse particles are the same as applicants', it would be reasonably expected that physical properties of each would also be the same. As such, the claimed brittle characteristics and strength relationship as claimed would be expected to be present to one having ordinary skill absent an objective showing to the contrary (**Claims 4 and 16**).

Regarding claims 9 and 21: The ceramic coarse particles and the fine crystalline particles within the bonding layer are taught to be silicon carbide (all) thereby, meeting applicants' claim 9 (**Claims 9 and 21**).

Regarding claims 11 and 23: Also, the coarse particles do not contain carbonaceous substances and the fine particles include such substrates (Pg. 6, paragraph 1). In such a sintered body, Ito teaches that the coarse particles are in an amount of 200 parts by weight with the fine particles being in an amount of 100 parts by weight (Pg. 13,

paragraph 3). This provides a ratio of 2:1 falling within applicants range (**Claims 11 and 23**).

Regarding claims 25-28: As the reference fails to teach specifically the applicants' claimed sizes for both the fine and coarse particles this would have been obvious. For instance, while Ito discloses in some embodiments that the coarse particles have an average diameter of 100 microns, nowhere in their teaching do they limit the size to 100. Therefore, one having ordinary skill would know that the size could be varied. Further, it is well known in the art that particle size is result effective as adjusting the size, physical properties will change such as strength, etc. of the bonding layer and/or the main coarse component of the body as well as final size of the produced body. Therefore, one having ordinary skill would know that by adjusting the particle size of the coarse particles and/or the fine particles to any value, desired results can be obtained. As such, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Ito to include that the particle size of the coarse particles and/or fine particles can be modified to any size to obtain desired strength, etc. of the bonding layer and/or the main body component or overall body size (honeycomb size desired).

Additionally, the examiner notes that through such routine experimentation, the applicants' claimed pore size and size distribution will still occur. This is due to the claimed sized particles producing applicants' distribution as well as since it was discussed that the pore size is dependent on the size distribution and this will be obtained from such sized particles, then so will the claimed pore size will (**Claims 25-28**).

5. Claims 7-8 and 19-20 are rejected under 35 U.S.C. 103(a) as being obvious over Ito (JP 0323779) as applied to claims 1 and 13 from the above section 4, in view of Okuno et al. (US PN. 4,701,426).

Regarding claims 7 and 19: As discussed, Ito teaches applicants' invention of claims 1 and 13. However, the reference does not specifically disclose the use of a sintering aid chosen from the claimed groups within the bonding layer although this would have been obvious.

For instance, Ito is illustrating that the bonding layer is silicon carbide with a carbonaceous material such as carbon black on the grain boundaries (Pg. 8, paragraph 1) in order to somewhat inhibit grain growth of the fine silicon carbide particles during sintering (Pg. 6, paragraph 1). According to Okuno et al., a sintered silicon carbide material can have effective grain growth inhibition with the use of carbon black, but additionally, sintering aids such as aluminum can be added therein in order to provide efficient sinterability and thermal shock resistance (Col. 3, lines 48-67-Col. 4, lines 1-16). As both Ito and Okuno et al. disclose analogous inventions related to sintered silicon carbide materials with carbon black added therein for the purpose of inhibiting grain growth, one having ordinary skill in the art would recognize from Okuno that incorporating a sintering aid (aluminum) in such a composition would help the materials sinterability and provide shock resistance which Okuno illustrates is desirable. As such, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Ito to include that a sintering aid such as aluminum can be added to the

SiC/carbon black bonding layer in order to obtain efficient sinterability and thermal shock resistance for such a combination (**Claims 7 and 19**).

Regarding claims 8 and 20: Further, the examiner notes that the above modification was to include the sintering aid within the bonding layer itself and not the plate like coarse crystals because Okuno was illustrating that such an addition is desired in a composition similar to the bonding layer. As such, through the above modification, no sintering aid was added to the coarse crystals and therefore, the content of sintering aid is higher within the bonding layer (>0%) than the coarse particles (0%) (**Claims 8 and 20**).

Response to Arguments

Applicant's arguments filed February 17, 2009 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAUREN ROBINSON whose telephone number is (571)270-3474. The examiner can normally be reached on Monday to Thursday 6am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lauren E. T. Robinson
Examiner
AU 1794

/LAUREN ROBINSON/
Examiner, Art Unit 1794

/Timothy M. Speer/
Primary Examiner, Art Unit 1794